

Title: *hubUB3* GENE INVOLVED IN HUMAN CANCERS

Inventor(s): Todd W. Seeley Express Mail No. EL755724263US Docket No. PP-01406.004/200130.438D1

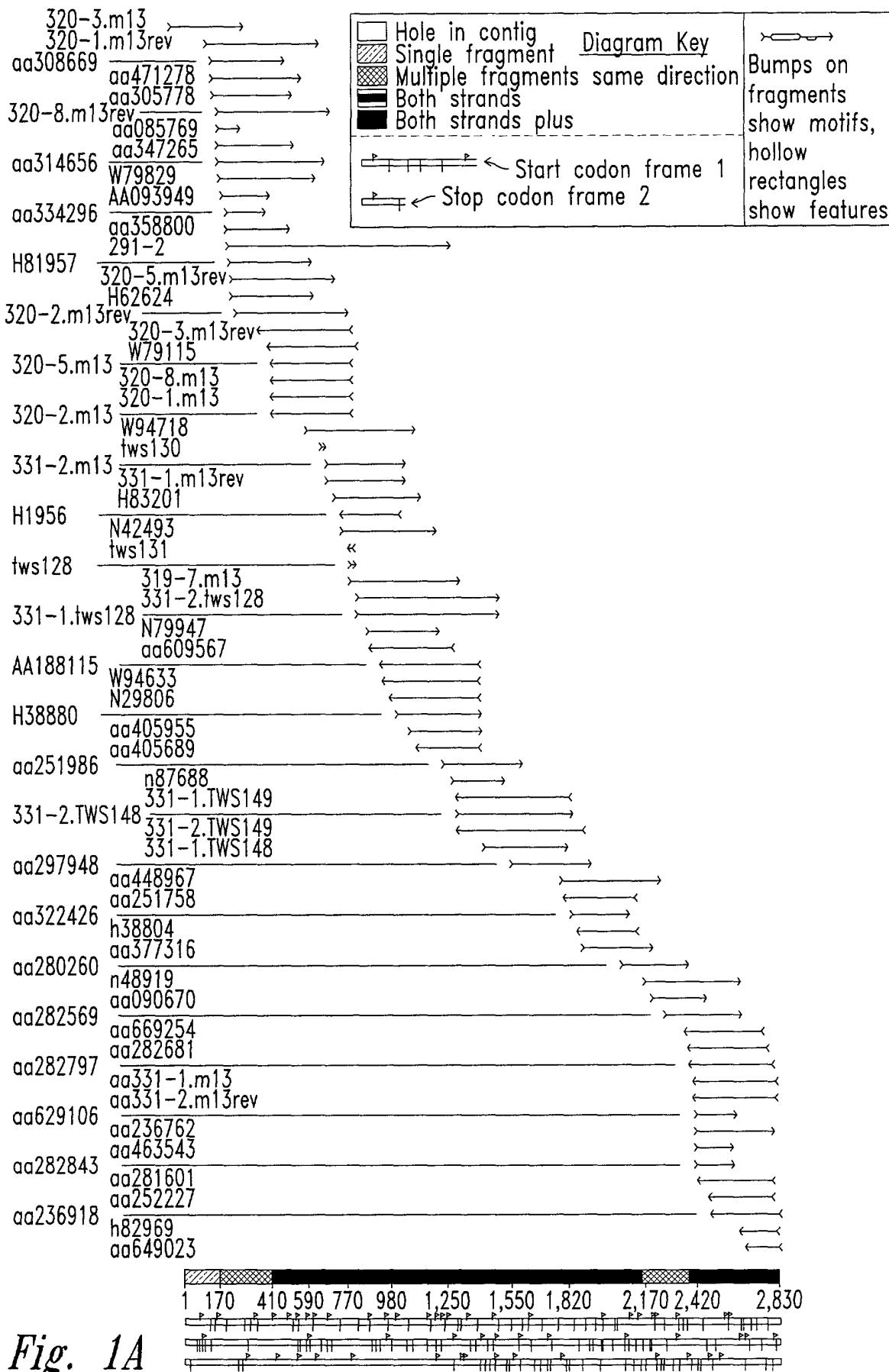


Fig. 1A

GAAGCAAGGAGGCCGGCGGCCGAGCGAGTGGCGAGTAGTGGAAACGTTGC
TTCTGAGGGGAGCCAAGATGACCGGTTCTAACGAGTTCAAGCTGAACCAGCC
ACCCGAGGATGGCATCTCCTCCGTGAAGTTCAACCTCCCAGTTCT
GCTTGTCCTCCTGGGACACGTCCGTGCGTCTACGATGTGCCGGCAACTCC
ATGCGGCTCAAGTACCAACGGCGTCTGGACTGCGCCTCTACGAT
CCAACGCATGCCTGGAGTGGAGGACTAGATCATCAATTGAAAATGCATGATT
TGAACACTGATCAAGAAAATCTGTTGGGACCCATGATGCCCTATCAGATGT
GTTGAATACTGTCCAGAAGTGAATGTGATGGTCACTGGAAGTTGGGATCAGA
CAGTTAAACTGTGGGATCCCAGAACTCCTGTAATGCTGGACCTCTCAGC
CTGAAAAGGTATATACCCCTCAGTGTCTGGAGACCGGGCTGATTGTGGGAAACA
GCAGGCCGAGGTCCAGCCTGAAATACAGACTCGCTGCATACGAGCGTTCAA
GCGCAGGGAGTCCAGCCTGAAATACAGACTCGCTGCATACGAGCGTTCAA
ACAAGCAGGGTTATGTATTAAGCTTATTGAAGGCCAGTGGCAGTTGAGTA
TTTGGACCCAAGCCCTGAGGTACAGAAGAAGATGCTCAAATGTCAC
AGACTAAAAGAAAATAATTGAGCAGATTACCCAGTCAATGCCATTCTT
TTCACAATATCCACAATACATTGCCACAGGTGGTCTGATGGCTTGTAAAT
ATTGGGATCCATTAAACAAAAAGCGACTGTGCCAATTCCATCGGTACCCAC
GAGCATCGCATCATTGCCCTCAGTAATGATGGACTACGCTGCAATAGCGT
CATCATATATGTATGAAATGGATGACACAGAACATCCTGAAGATGGTATCTT
CATTGCCAAGTGACAGATGCAGAAACAAACCCAGTCACCATGTTGAC
CAAGATTCTATTACTTAAGTGCATGTTGATGATAATAAAACAATTGTCAC
TCCCCAATGGTGGATTATTACTATTAAAGAAACCAGGGAAAATATTAAATT
TAATATTATAACAACCTGAAAATAATGGAAAGAGGTTTTGAATTTTTT
TTTAAATAAACACCTTCTTAAGTGCATGAGATGGTTGATGGTTGCTGCATT
AAAGGTATTGGCAAACAAAATTGGAGGGCAAGTGACTGCAGTTGAGA
ATCAGTTTGACCTTGATGATTTTTGTTCCACTGTGGAAATAATGTTGTA
ATAAGTGTAATAAAATCCCTTGCAATTCTTCTGGACCTTAAATGGTAGA
GGAAAAGGCTGAGCCATTGTTCTTGCTGGTTAGTTGCTAATTCTA
AAGCTGCTTCAGACTGCTTCATGAGGAGGTTAATCTACAATTAAACAATT
TCCTCTGGCGTCCATTATTTCTGAAGCAGATGGTCATCATTCTGGCTG
TTAAACAAAGCGAGGTTAAGGTTAGACTCTGGGAATCAGTAGTTCAAT
CTTATTAGGGTGCAGAAGGAAAATAAGAAAACCTCTAATATCATT
GTGACTGTAAACAATTATTAGCAAACAATTGATCCAGAAGGGCAAAT
TGTTGAGTCAGTAATGAGCTGAGAAAAGACAGAGCATATCTGTGATTGG
AAAATAATTGTAACGTAATTGCAAGTGCATTAGACAGGCATCTATTGGAC
CTGTTCTATCTAAATGAATTGGAAACATTAATGAGGTTACATATT
CTCTGACATTATAGTTCTATGTCCTTCAGTTGACCGCCGCTGGTGA
TAAAGTTAAAAGAAAAAATTATAGTGAGAATGAGATTCAATTGTA
ATGCACTAAAGCAGAACACGAACCTAGCTTGGCTATTCTAGGTAGTCCAA
ATAGTATTGTTGTCAAACTTAAATTATATTAAATTGCAAATGTATGT
CTCTGAGTAGGACTTGGACCTTCCTGAGATTATTATCCGTGATGTATT
TTTAATTCTTTGATACAGAGAAGGGCTTTTTTTAAGTATTCAAGTGA
AAACTGGTGAAGTCTGAACCCATCTTGTAAATGTATTCTTCATTGAG

Fig. 1B

GTCCACCTAATCATCCTGTGAAAGTGGTTCTCTATGGAAAGCTTGTTGCTT
CCTACAAATACATGCTTATTCTTAAGGGATGTGTTAGAGTTACTGTGGATT
CTCTGTTCTGCTTACAAGAAACTGTCTATGTACCTTAATACTTGTAG
GATGAGGAGTCTTGTGTCCTGTACAGTAGTCTGACGTATTCCCCTCTGTC
CCCTAGTAAGCCAGTTGCTGTATCTAACAGTTGAGCTCTTTGTAATATA
CTCTAAACCTGTTATTCTGCTAATAACGAGATGCAGAACCCCTGAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

Fig. 1B
(Continued)

Alignment of predicted huBUB3 gene products from ~1.4 Kb cDNA and ~2.7 Kb cDNA

	20	40	60
huBUB3 2.7	MTGSNEFKLNQPPEDGISSVKFSPNTSQFLVSSWDTSVRLYDVPANSMRLKYQHTGAVL		
huBUB3 1.4	MTGSNEFKLNQPPEDGISSVKFSPNTSQFLVSSWDTSVRLYDVPANSMRLKYQHTGAVL		
	80	100	120
huBUB3 2.7	DCAFYDPTHAWSGGLDHQLKMHDLNTDQENLVGTHDAPIRCVEYCPEVNVMVTGSWDQTV		
huBUB3 1.4	DCAFYDPTHAWSGGLDHQLKMHDLNTDQENLVGTHDAPIRCVEYCPEVNVMVTGSWDQTV		
	140	160	180
huBUB3 2.7	KLWDPRTPCNAGTFSQPEKVYTLSVSGDR利VGTAGRRVLVWDLRNMGYVQQRRESSLKY		
huBUB3 1.4	KLWDPRTPCNAGTFSQPEKVYTLSVSGDR利VGTAGRRVLVWDLRNMGYVQQRRESSLKY		
	200	220	240
huBUB3 2.7	QTRCIRAFPNKQGYVLSSIEGRVAVEYLDPSPEVQKKYAFKCHRLKENNIEQIYPVNAI		
huBUB3 1.4	QTRCIRAFPNKQGYVLSSIEGRVAVEYLDPSPEVQKKYAFKCHRLKENNIEQIYPVNAI		
	260	280	300
huBUB3 2.7	SFHNIHNTFATGGSDGFVNIDPFNKKRLCQFHRYPTSIASLAISNDGTLAIASSYME		
huBUB3 1.4	SFHNIHNTFATGGSDGFVNIDPFNKKRLCQFHRYPTSIASLAISNDGTLAIASSYME		
	320		
huBUB3 2.7	MDDTEHPEDGIFIRQVTDAETPKSPCT		
huBUB3 1.4	MDDTEHPEDGIFIRQVTDAETPKVHLIIL		

Fig. 2

scBUB3	1	- - - - -	-MQIVQIEQAPKDYISDIKIIP---SKSLLL	27
muBUB3	1	- - - - -MTG-----	-SNEFKLNQPPPEDGISSVKFSPN--TSQFLL	31
huBUB3	1	- - - - -MTG-----	-SNEFKLNQPPPEDGISSVKFSPN--TSQFLL	31
rae1-hu	1	MSLFGTTSGFGTSGTSMFGSATT--DNHNPMKDIEVTSSPDDSIGCLSFSPPTLPGNFLI	58	
rae1	1	MSLFG-----QATTSTVSNATG-----DLKKDVEVAQPPEDSISDIAFSP---QAEYLA	46	
yet7	1	MSFFNR----SNNTSALGTSTAMANEKDLANDIVNSPAEDSISDIAFSP---QQDFMF	52	
			. D I . P	
scBUB3	28	ITSWDGSITVYKFD I QAKNV DLLQLSLRYKH--PLLCCNFI-DNTDLQIYVGTVQGEILK	II	83
muBUB3	32	-VSSWDT--SVRLYDVPA--NSM-R-LKYQHTGAVLDCAFY-DPT--HAWSGGLDHQLKM		81
huBUB3	32	-VSSWDT--SVRLYDVPA--NSM-R-LKYQHTGAVLDCAFY-DPT--HAWSGGLDHQLKM		81
rae1-hu	59	-AGSWAN--DVRCWEVQDSGQTIPK-AQMHTGPVLDVCWSDDGS--KVFTASCDKTAKM		112
rae1	47	-ASSWDS--KVRIYEVQATGQSIGK-ALYEHQGPVLVNSWRDGT--KVASGSVDKSAKV		100
yet7	53	SASSWDG--KVRIWDVQN-GVPQGR-AQHESSSPVLCTRWSNDGT--KVASGGCDNALKL		106
		SW V L D . .		
scBUB3	84	I VDLIGSPSFQALTNNNEANLGICRICKYGD--DKLIAASWDGLIEVIDPRNYGDGVIAVKN	III	141
muBUB3	82	HDLNTDQENLVGTHDAPIRCVEYCPEVN-----MVTGSWDQTVKLWDPR-TPCNAGTFS-		135
huBUB3	82	HDLNTDQENLVGTHDAPIRCVEYCPEVN-----MVTGSWDQTVKLWDPR-TPCNAGTFS-		135
rae1-hu	113	WDLSSNQAIQIAQHDAPVKTIHWKAPNY--SCVMTGSWDKTLKFWDTR-SSNPMMVLQ-		168
rae1	101	FDIQTGQNQQVAHDDAVRCVRFVEAMGT-SPILATGSWDKTLKYWDLR-QSTPIATVS-		157
yet7	107	YDIASGQTQQIGMHSAPIKVLRVQCGPSNTECIVTGSWDKTIKYWDMR-QPQPVSTM-		164
		D. . . . SWD . . DR		
scBUB3	142	LNSNNTKVKNKIFTMDTNSSRLIVGMNNISQVQWFRPLCEDDNGTIEESGLKYQIRDVAL	IV	201
muBUB3	136	Q-----PEKVYTLSVSGDRLLIVGTAGRRVLVWDLWNMGYVQQRRE-SSLKYQTRCIRA		187
huBUB3	136	Q-----PEKVYTLSVSGDRLLIVGTAGRRVLVWDLRNMGYVQQRRE-SSLKYQTRCIRA		187
rae1-hu	169	L-----PERCYADVIYPMAVVATAERGLIVYQLENQPSEFRRIE-SPLKHQHRCVAI		220
rae1	158	L-----PERVYAMDCVHPLLTVATAERNICVINSEPTKIFKLM-SPLKFQTRSAC		209
yet7	165	M-----PERVYSMDNKQSLLVVATAERHIAINLANPTTIFKATT-SPLKWQTRCVAC		216
	 V . L S L K Q R .		

Fig. 3A

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		V	
scBUB3	202	LP---KEQEGYACSSSIDGRVAVEFFDDQGDDYNSSKRFAFRCHRLNLKD-TNL-----	250
muBUB3	188	FP---NK-QGYVLSSIEGRVAVEYLDPS-PEV-QKKYAFKCHRLKENN-IEQ-----	233
huBUB3	188	FP---NK-QGYVLSSIEGRVAVEYLDPS-PEV-QKKYAFKCHRLKENN-IEQ-----	233
rae1-hu	221	FKDKQNKPPTGFALGSIEGRVAIHYINPP-NP--AKDNFTFKCHRSNGTNTSAP----QD	272
rae1	210	F----IKGDGYAIGSVEGRCAIQNIDE--KN--ASQNF SFRCHR NQAGN-SAD-----	253
yet7	217	Y----NEADGYAIGSVEGRCSIRYIDDG-MQ--KKSGFSFKCHRQTNPN-RAPGSNGSQL	268
		G. S..GR ..	.F.CHR
		VI	
scBUB3	251	AYPVNSIEFSPRHKFLYTAGSDGIISCWNLQTRKKIKNFAKFNED-SVVKIACSDNILCL	309
muBUB3	234	IYPVNAISFHNIHNTFATGGSDGFVNIIWDPFNKKRLCQFHRYPTSIASLAFLSNDGTTLAI	293
huBUB3	234	IYPVNAISFHNIHNTFATGGSDGFVNIIWDPFNKKRLCQFHRYPTSIASLAFLSNDGTTLAI	293
rae1-hu	273	IYAVNGIAFHPVHGTLATVGSDFRFSFWDKDARTKLKTSEQLDQPISACCFNHNGNIFAY	332
rae1	254	VYSVNSIAFHPLYGTFTAGSDGTFSFWDKDSHQRLKSYPNVGGTISCSTFNRTGDIFAY	313
yet7	269	VYPVNSIAFHPLYGTFTAGGDGTFNFWDKNQRHRLKGYPTLQASIPVCSFNRNGSVFA Y	328
		Y VN I F	T G DG
		W
scBUB3	310	ATSDDTFKTNAAIDQTIELNASSIYIIFDYEN-----	341
muBUB3	294	ASSYMYEMDDT-EHPE---DGIFIRQVTDAETKPKS---T	326
huBUB3	294	ASSYMYEMDDT-EHPE---DGIFIRQVTDAETKPKSPC-T	328
rae1-hu	333	ASSYDW SKGHEFYNPQKK-NYIFL RNA-AEELKPRNKK--	368
rae1	314	AISYDW SKGYTFNNAQLP-NKIMLHPVPQDEIKPRPKKGR	352
yet7	329	ALSYDW HQGHMGNRPDYP-NVIRLHATTDEEVKEK-KK-R	365
		A S	E

Fig. 3B

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Fig. 4A

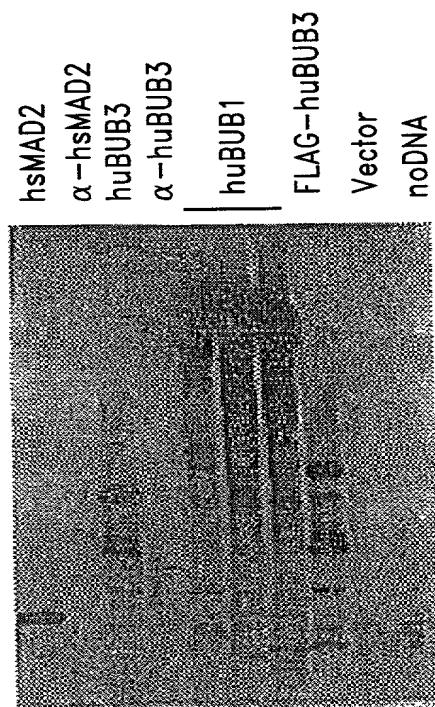
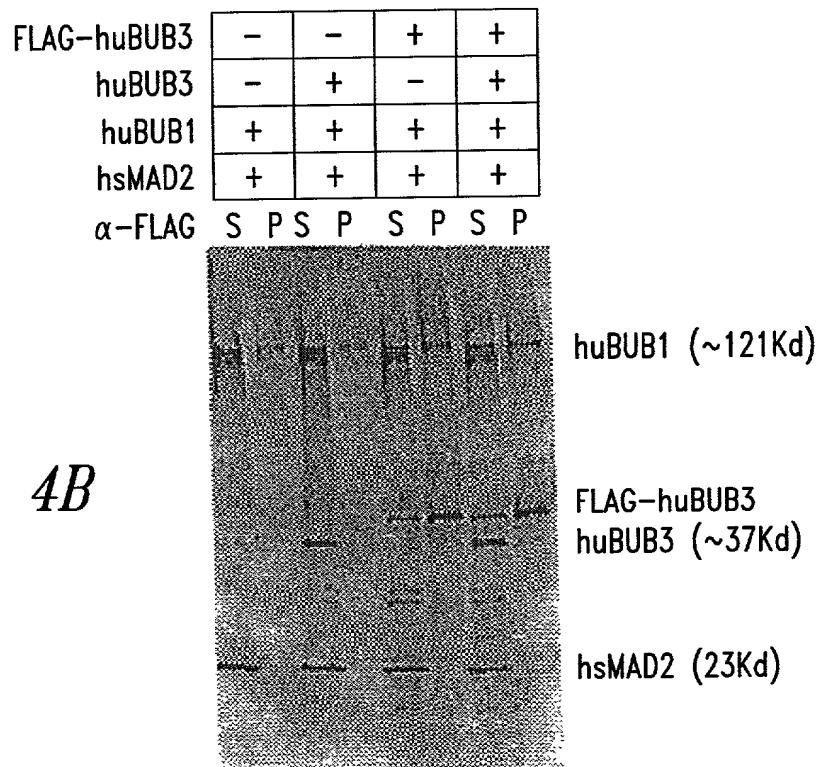


Fig. 4B



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mRNA expression of BUB/MAD homologs in various tissues.

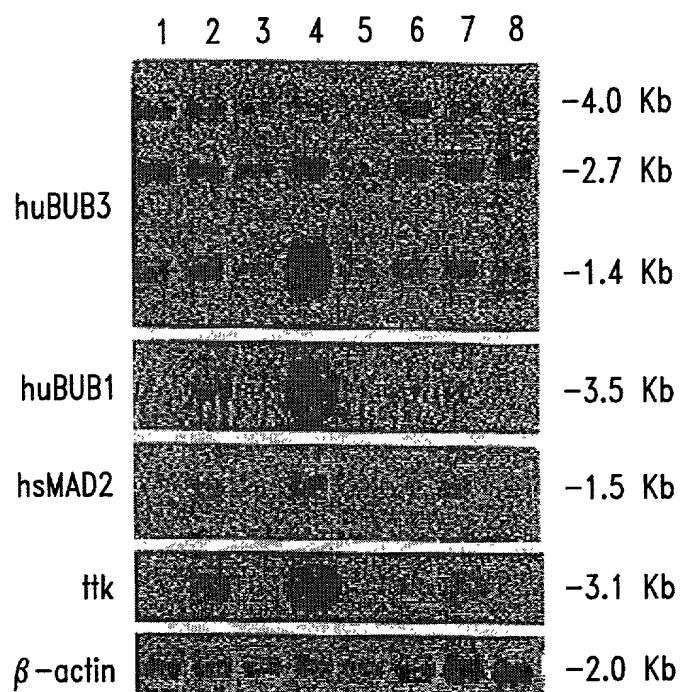


Fig. 5